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ON HETEROCATALYTIC DETONATIONS I. (U)
Hydrodynamic Lenses and Radiation Mirrors

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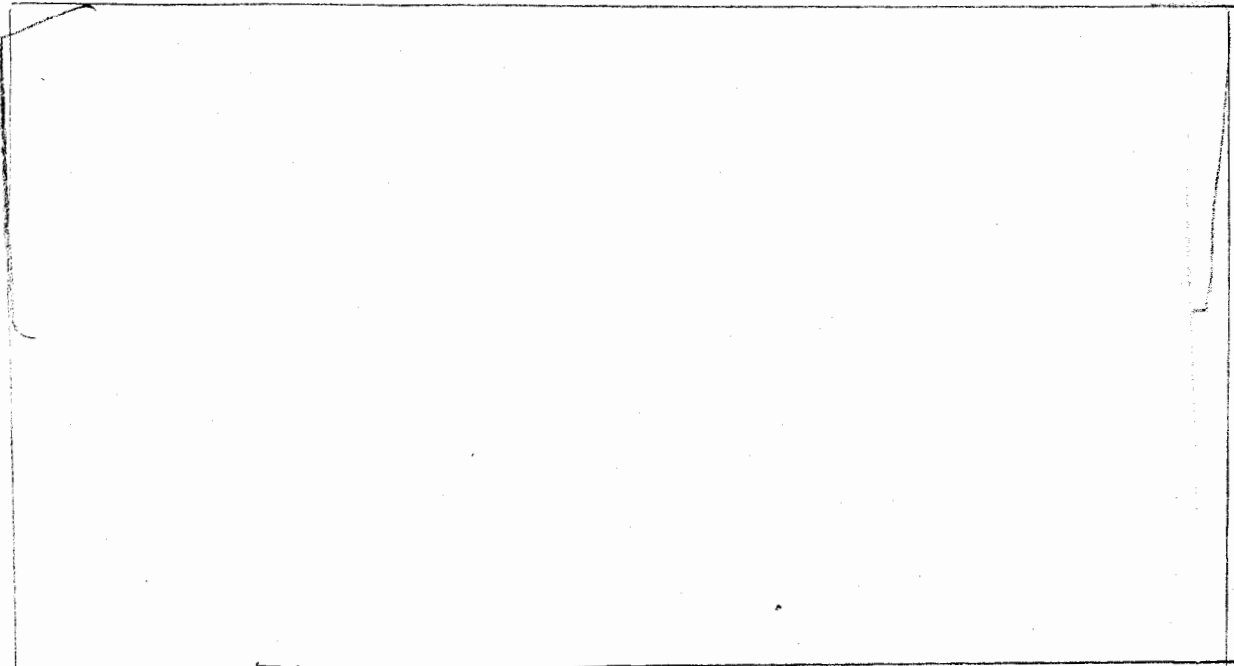
ON HETEROCATALYTIC DETONATIONS I.Hydrodynamic Lenses and Radiation MirrorsIntroduction

In this discussion the following general scheme is considered. By an explosion of one or several conventional auxiliary fission bombs, one hopes to establish conditions for the explosion of a "principal" bomb. This latter may be either a fission or a thermonuclear assembly.

We propose to discuss certain general features of such an arrangement. The main purpose of the "auxiliary" system is to induce very high compressions in the principal assembly. It is known (L. W. Nordheim, unpublished data) that, for example, in the "Alarm Clock" high compressions of the active core will permit economy in the tritium put initially into the system and may be instrumental in starting thermonuclear reactions in assemblies of a feasible size. Ordinarily one uses high explosives as the auxiliary system. Great compression can be obtained, but the size of the highly compressed region is small. In certain thermonuclear arrangements, like the Alarm Clock, the size and the mass of the material to be compressed is so great that inordinate amounts of HE would have to be used. We have the following situation in mind, as an example.

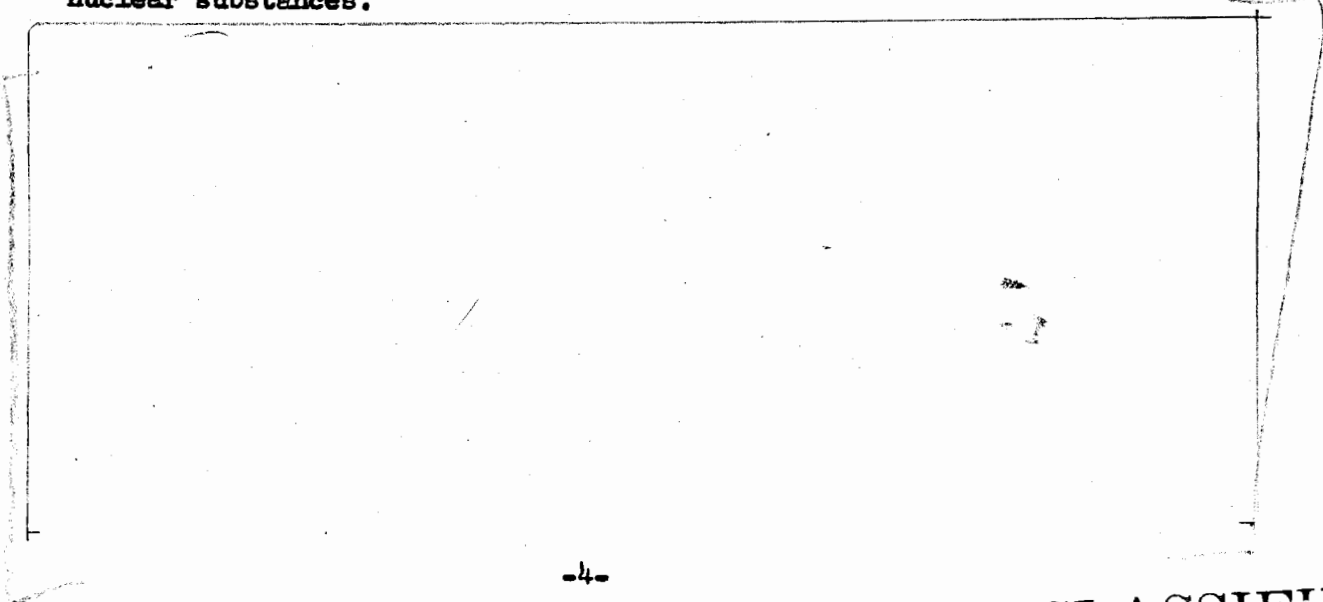
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We shall discuss in the sequel the hoped-for compressions.

The arrangement might be called heterocatalytic, involving as it does a setting off of a reaction in one system by a reaction started in another material--the "auxiliary" arrangement is located at a considerable distance (from the purely nuclear point of view), like 50 cm to 5 meters. This is in distinction to hitherto-considered autocatalytic schemes based essentially on self-implosions of a mixture of nuclear substances.



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